

Application Serial No. 10/589,569

REMARKS

The Office Action of December 20, 2008, the references cited therein, and the Examiner's remarks in the Advisory Action of May 1, 2009, have been carefully considered.

In this Amendment, claim 1 has been further amended by more specifically defining the relationship between the conical bore and the extent of the bus bar in order to more clearly distinguish the claims over cited prior art. In particular, claim 1 has been amended to positively state that the first and second plane surfaces of the bus bar are parallel and that the conical bore extends between the two parallel plane surfaces as clearly shown in the drawings. As a result, all surfaces of the conical bore are surrounded by the good heat conducting material of the bus bar so that the improved soldering connections result as discussed in detail in the present application and in the "Remarks" sections of the previous Amendments. Moreover, new claim 6, dependent on claim 1, has been added to positively recite that the bus bar is a stand-alone bus bar, i.e., there are no insulating layers disposed on the bus bar, at least adjacent the conical bore, which can hinder the heat dissipation during soldering.

The rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over the patent to Lynch (U.S. 4,001,490) in view of the patent to Steigerwalt et al. (U.S. 2,912,745) has been noted and is respectfully traversed. The Remarks concerning this ground of rejection found in the Amendment filed April 14, 2009, are believed to still be pertinent here and, rather than repeat these arguments, they are incorporated by reference. In the Advisory Action, the Examiner has, in general terms, attempted to refute Applicant's statement that the Lynch and Steigerwalt patents were combined using hindsight in an attempt to reach Applicant's invention. While the Examiner's legal reasoning regarding the use of "hindsight" appears to be reasonable based on the very general statement of the factual teachings of the two references involved in this rejection, the actual facts involved are not so general. That is, the primary reference to Lynch does not simply show a solid metal bus bar, and the secondary reference to Steigerwalt does not supply the details of a conical solder bore. In fact, the crux of

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Applicant's argument is that hindsight was used in combining the references because the actual teachings of the two references were incompatible, and thus one skilled in the art would not consider combining same.

It is again pointed out that the Lynch patent is not concerned with soldering a bus bar to an electronic component lead wherein heat dissipation is a problem in order to avoid damaging the component. Rather, the Lynch patent is concerned with soldering a bus bar (10) to a substantially large terminal post (20, 22) extending from a circuit board, a situation in which heat dissipation is not a problem. To make the connections to the terminals (20, 22) according to the Lynch patent, the bus bar (10) according to FIG. 6 is twisted adjacent the apertures (15) to produce or form an interference or force fit within the aperture (15) between the bus bar and the terminal post (20) as shown, for example, in FIGS. 3 and 4 of Lynch and described, for example, in column 5, lines 26-48. This interference fits between the bus bar aperture (15) and the terminal post (20), creating a very small or tiny gap around the post (20); and this small, uneven gap is required to hold the bus bar in place during heating and soldering. **Such a connection or interference fit would not be possible with a conical bore through the bus bar,** as suggested in the Office Action, because the expanding bore would not permit holding or gripping of the bus bar in a force fit as is required according to the teachings of Lynch. Accordingly, one skilled in the art would not consider providing the bus bar of Lynch with a conical bore.

Additionally, the solder is applied according to Lynch by a solder layer applied to one surface of the bus bar. This entire bus bar is heated, and the solder will flow because of the contact or interference fit between the terminal post 20 and the bus bar within the small aperture 15, and thus with the solder layer 10. However, if the aperture 15 were conical and oriented as suggested by the Examiner, there would be **no contact** between the terminal post and the solder layer on the surface of the bus board, and thus no solder flow. Consequently, for this additional reason, one skilled in the art would not consider combining the teachings of Lynch and Steigerwalt.

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Moreover, Steigerwalt does not teach a conical bore for a solder nest. Rather, the Steigerwalt patent teaches that in a printed circuit, a metalized conical depression surrounding the punched hole should be provided in order to supply additional bonding area for the solder to enable dip soldering. However, heat dissipation is not a concern; and there is no teaching that this would have any advantage, except in the case of dip soldering of circuit boards. There clearly is no teaching that the conical shape would have any benefit in a solid bus bar not used with dip soldering or where large surface areas are readily available.

Claim 1 has been further amended to recite that the conical bore is located entirely between the two parallel outer plane surfaces of the bus bar. Such is clearly not the case in either Lynch or Steigerwalt.

In summary, one skilled in the art would not consider combining the teachings of the Lynch and Steigerwalt patents in the manner suggested in the Office Action. Since the two references are involved with the solution of different problems and different conditions, they would not be compatible, resulting in a poor or faulty solder connection. Accordingly, for the above-stated reasons, it is submitted that claim 1, and claims 2-5 dependent thereon, are allowable over the combination of the Lynch and Steigerwalt patents under 35 U.S.C. §103(a).

Newly presented claim 6 recites that the bus bar is a stand-alone bus bar which is not in contact with any solid insulating material, at least adjacent the conical bore. As a result, the heat can be dissipated safely due to the shape of the aperture without damaging the component attached to the lead being soldered. In any case, this claim is allowable for at least the same reasons as claim 1, from which it depends.

Reconsideration of the rejection of rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over the patent to Adachi et al. (U.S. 5,065,283) in view of the patent to Steigerwalt et al. (U.S. 2,912,745) likewise is respectfully requested. Again, the Remarks found in the last Amendment with regard to this ground of rejection are still pertinent and are incorporated by reference. As with the Lynch reference, it is

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submitted that one skilled in the art would not consider the combination suggested by the Examiner, since the result would be an inferior solder connection.

As pointed out in the Remarks of the last Amendment, if the aperture (7) of Adachi were made conical as suggested by the Examiner, a larger volume of heated solder would be present, resulting in extended exposure of the lead to heat, since the bus bar cannot dissipate the heat as one of its sides is not cooled by air, but is heat-insulated by PC board (6). Moreover, since the heat is applied by immersing the entire bus bar in liquid solder, there is again the problem of extended heat, since the portions of the bus bar away from the soldering site will become heated and further decrease the speed of heat dissipation. Note further that according to FIG. 2 of Adachi, the diameter of the terminal or lead portion (42) must be only slightly smaller than the diameter of the aperture (5) in the bus bar, and soldering along the length of the pin takes place by capillary action when the bar is immersed in the solder. If a conical aperture is provided in the embodiment of FIG. 2, then, as required by claim 1 and as suggested by the Examiner, the larger end of the conical aperture would come in contact with the solder, which would prevent capillary action from taking place, thus resulting in an inferior connection. In this regard, note FIG. 1 of Adachi, wherein a conical opening (5) for the lead is provided and an inferior solder joint results. Accordingly, one skilled in the art would not consider making the aperture of FIG. 2 of Adachi conical, since it would be contrary to the basic teaching of the reference and would essentially result in the inferior embodiment of FIG. 1 of Adachi.

The further amendments to claim 1 even more clearly distinguish claim 1 over Adachi. Clearly, if the bore of FIG. 2 of Adachi were made conical, it would not extend between two parallel outer plane surfaces of the solid bus bar as now required by claim 1, but rather would appear similar to the arrangement of FIG. 1 of Adachi. Moreover, the result would not be a stand-alone bus bar as now defined in new claim 6. Accordingly, for the above-stated reasons, it is submitted that claim 1, and claims 2-6 dependent thereon, are allowable over the combined teachings of the Adachi and Steigerwalt patents.

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In view of the above amendments and for the above-stated reasons, it is submitted that all of the pending claims, i.e., claims 1-6, are allowable over the art of record and are in condition for allowance. Such action and the passage of this application to issue are, therefore, respectfully requested. It is noted that counterpart applications have been allowed in at least the European and Japanese Patent Offices.

If the Examiner is of the opinion that prosecution of this application would be advanced by a personal interview, he is invited to telephone undersigned counsel to arrange for such an interview.

To the extent necessary during prosecution, Applicant hereby requests any required extension of time not otherwise requested and hereby authorizes the Commissioner to charge any required fee not intentionally omitted, including application processing, extension, extra claims, statutory disclaimer, issue, and publication fees, to Deposit Account 06-1135.

Respectfully submitted,

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